

PATENT

Atty. Dkt. No. SAR 13365

**LISTING OF CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) An apparatus for optically generating signals, the apparatus comprising:
  - (a) a mode-locked semiconductor laser that generates mode-locked optical radiation with emitted wavelengths separated by approximately 10 GHz to approximately 300 GHz;
  - (b) an optical demultiplexer with a demultiplexer input, a first demultiplexer output, and a second demultiplexer output, the demultiplexer input being coupled to said mode-locked semiconductor laser, wherein said optical demultiplexer serves as a wavelength separator capable of selecting a first wavelength for said first demultiplexer output and a second wavelength for said second demultiplexer output;
  - (c) an optical modulator having a modulator input and a modulator output, the modulator input being coupled to the first demultiplexer output; and
  - (d) an optical multiplexer having a first multiplexer input, a second multiplexer input, and a multiplexer output, the first multiplexer input being coupled to the modulator output, the second multiplexer input being directly coupled to said second demultiplexer output.
2. (Original) The apparatus of claim 1, wherein the mode-locked semiconductor laser is a semiconductor racetrack laser.
3. (Original) The apparatus of claim 1, wherein the optical modulator is a Mach-Zehnder modulator.
4. (Original) The apparatus of claim 1, further including processing electronics coupled to the optical multiplexer output, the processing electronics containing

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components necessary for downconverting the data signal received from the optical multiplexer.

5. (Currently amended) An apparatus for generating optical signals, the apparatus comprising:

- (a) means for generating mode-locked optical radiation;
- (b) an optical demultiplexer for separating the generated mode-locked optical radiation into a first signal and a second signal, the first signal and second signal being separated by approximately 60 GHz;
- (c) means for modulating the first signal, thereby creating a modulated signal; and
- (d) means for subtracting the difference between the modulated signal and the second signal, where the second signal comprising an unmodulated signal.

6. (Currently amended) A method for generating an optical signal, the method comprising:

- (a) generating a first mode and a second mode in a mode-locked light source;
- (b) separating the first mode from the second mode by using an optical demultiplexer, wherein said first mode comprises a first wavelength of a light from said mode-locked light source and said second mode comprises a second wavelength of said light from said mode-locked light source;
- (c) modulating the first mode with data;
- (d) combining the second mode with the modulate first mode, where the second mode comprising an unmodulated mode;
- (e) downconverting the combined second mode and modulated first mode.